

JPRS 77083

31 December 1980

USSR Report

ENERGY

No. 43



FOREIGN BROADCAST INFORMATION SERVICE

NOTE

JPRS publications contain information primarily from foreign newspapers, periodicals and books, but also from news agency transmissions and broadcasts. Materials from foreign-language sources are translated; those from English-language sources are transcribed or reprinted, with the original phrasing and other characteristics retained.

Headlines, editorial reports, and material enclosed in brackets [] are supplied by JPRS. Processing indicators such as [Text] or [Excerpt] in the first line of each item, or following the last line of a brief, indicate how the original information was processed. Where no processing indicator is given, the information was summarized or extracted.

Unfamiliar names rendered phonetically or transliterated are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear in the original but have been supplied as appropriate in context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by source.

The contents of this publication in no way represent the policies, views or attitudes of the U.S. Government.

PROCUREMENT OF PUBLICATIONS

JPRS publications may be ordered from the National Technical Information Service (NTIS), Springfield, Virginia 22161. In ordering, it is recommended that the JPRS number, title, date and author, if applicable, of publication be cited.

Current JPRS publications are announced in Government Reports Announcements issued semimonthly by the NTIS, and are listed in the Monthly Catalog of U.S. Government Publications issued by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Indexes to this report (by keyword, author, personal names, title and series) are available through Bell & Howell, Old Mansfield Road, Wooster, Ohio, 44691.

Correspondence pertaining to matters other than procurement may be addressed to Joint Publications Research Service, 1000 North Glebe Road, Arlington, Virginia 22201.

Soviet books and journal articles displaying a copyright notice are reproduced and sold by NTIS with permission of the copyright agency of the Soviet Union. Permission for further reproduction must be obtained from copyright owner.

31 December 1980

USSR REPORT

ENERGY

No. 43

CONTENTS

ELECTRIC POWER

- Biographical Data on Energy Minister P.S. Neporozhniy
(ENERGETIKA, No 9, 1980)..... 1

FUELS

- Gas Industry Achievements Under Tenth Five-Year Plan Summed Up
(S.A. Orudzhev; TRUD, 22 Nov 80)..... 4
- Azerbaijan Oil, Gas Accomplishments Reviewed
(AZERBAYDZHANSKOYE NEFTYANOYE KHOZYAYSTVO, Sep 80)..... 7
- Mangyshlak Fuel, Energy Problems Listed
(V. Savchenko; NARODNOYE KHOZYAYSTVO KAZAKHSTANA, Aug 80).... 10
- Automated System of Scientific Information Aids Oil Industry
(A. Mit'ko; SOTSIALISTICHESKAYA INDUSTRIYA, 7 Oct 80)..... 12
- Gas Pipeline Transport, Corrosion Problems Discussed
(GAZOVAYA PROMYSHLENNOST', Oct 80)..... 14
- Corrosion Causes Failure
Gas Transport Cost Reductions
- Gusher Equipment Developed for High-pressure, Aggressive Wells
(T.K. Veliev, et al; GAZOVAYA PROMYSHLENNOST', Oct 80)..... 20
- Tyumen' Meeting Stresses Steps To Improve Oil-well Drilling,
Construction
(A.I. Botkilin, A.P. Retyumin; NEFTYANOYE KHOZYAYSTVO, Sep 80) 23

Slow Construction Work Delays Komi Oilfield Development (V. Krukovskiy; SOTSIALISTICHESKAYA INDUSTRIYA, 14 Oct 80)...	27
Cross-hauling of Coal, Building Materials Makes Transport a Bottleneck (V. Selyunin; SOTSIALISTICHESKAYA INDUSTRIYA, 9 Oct 80).....	29
New Rubber Mixture Improves Efficiency of Drilling Equipment (S.A. Abasov, et al; AZERBAYDZHANSKOYE NEFTYANOYE KHOSYAYSTVO, Sep 80).....	33
World's First Superdeep Well Drilled on Kola Peninsula (Ye. Kozlovskiy; IZVESTIYA, 9 Oct 80).....	36
Volzhskiy Plant Makes Thin-wall Spiral-wound Tube for Pipelines (V. Goncharov; PRAVDA, 20 Oct 80).....	40

ELECTRIC POWER

BIOGRAPHICAL DATA ON ENERGY MINISTER P.S. NEPOROZHNIY

Sofia ENERGETIKA in Bulgarian No 9, 1980 pp 33-34

[Article: "Petr Stepanovich Neporozhniy--USSR Minister of Power and Electrification Marks His 70th Anniversary"]

[Text] On 13 July 1980, Petr Stepanovich Neporozhniy, USSR minister of power and electrification, member of the CPSU Central Committee, deputy of the USSR Supreme Soviet, winner of the Lenin Prize and corresponding member of the USSR Academy of Sciences celebrated his 70th anniversary.

P. Neporozhniy has devoted more than 50 years of his life to the development of Soviet power and electrification. And 18 of them as the minister of this leading sector in the economy of the Soviet Union.

The biography of the prominent Soviet minister and scientist is a remarkably consistent tale of a human destiny wholeheartedly devoted to communist, civil and sociopolitical duty for the creation and construction of a socialist system in the great Soviet country which has set as the cornerstone in the strategy of its historical development Lenin's lasting motto "Communism is Soviet power plus the electrification of the entire country."

Born in 1910 in a rural family, P. Neporozhniy completed the Kiev Polytechnical School, and after this the Leningrad Water Transport Engineering Institute with a specialty as a hydraulic engineer. Prior to 1941, he worked in the construction and operation of the irrigation systems in Central Asia, in the Leningrad department of Hidroenergoprojekt [Design Institute for Hydropower], the chief of the technical section of Glavgidroenergostroy [Main Administration for the Construction and Installation of Hydroelectric Power Plants in the Central and Southern Regions], and chief construction engineer at the EnsoVETs [the Enso VETs (hydro-power plant)]. During World War II, P. Neporozhniy was the chief engineer and director of the Central Asian Division of Hidroenergoprojekt.

After the war he was appointed chief engineer for the construction of the Gornosvirskaia VETs, and later the chief engineer of the Svirstroy [Svir' Construction Trust] and for the construction of the Kakhovskaia VETs.

From 1954, Petr Neporozhniy was the deputy chairman of the Ukrainian Council of Ministers and the chairman of the Ukrainian Gosstroy, and after this the first deputy minister of construction of electric power plants in the USSR, and from

1962 up to the present, he has continuously held the position of USSR minister of power and electrification.



Bulgarian power engineers are familiar with and follow with enthusiasm the enormous achievements of Soviet power engineering. At the end of 1969, the USSR produced over 1.2 trillion kilowatt hours of electric power, while the total installed capacity of the power plants exceeded 250,000 megawatts. This was, respectively around 3.5- and 3-fold more than for 196...

At the present stage, the USSR is the only nation in the world to satisfy its energy needs with its own resources. In addition to developing its energy potential for the needs of its own economy and for raising the standard of living of the workers, it is also doing this to provide direct aid for the development of the power complexes in the nations of the socialist commonwealth as well as for other countries which are developing along noncapitalist lines.

In Bulgaria, over the last 20 years, the energy capacity has risen from 925 to 8,340 megawatts, and power output has gone up, respectively, from 4 billion to 33 billion kilowatt hours.

During the years since the April course of the BCP, the basic role in this rapid growth of Bulgarian power has been played by cooperation which is steady, ever-strengthening, and traditionally friendly and selfless, with the Soviet power workers, and the personal direct participation, understanding and attention by the minister, Petr Neporozhniy, a great friend of the Bulgarian power workers.

In 1978, Comrade Neporozhniy visited our nation as a guest of the Ministry of Power. He met with the ministry leadership, he visited a number of the leading power projects which he praised highly with his experienced eye as a construction engineer and power scientist, and he met with the energy labor collectives. The designers and scientific workers from Energoprojekt - State Design Institute for the Power Industry who had the good fortune to attend his lecture will long remember their meeting with the charming, energetic and highly erudite Soviet minister who during his brief talk further cemented the long traditional friendship and cooperation between Bulgarian and Soviet designers and scientists.

Under the direct leadership of Minister Neporozhniy, enormous work has been carried out in the USSR in introducing scientific and technical progress into electric power. For example, for the first time in Soviet hydropower construction, a method has been worked out and introduced for continuous concrete pouring, as well as a number of new methods to organize construction and production. These provide an opportunity to reduce the construction time and improve the quality of power construction.

Exceptional efficiency, all-round engineering erudition and rich construction experience make it possible for Comrade Neporozhniy to combine his leadership and engineering work with the work of a creative scientist and to undertake significant scientific activities.

A large portion of his numerous scientific works is widely known in Bulgaria and is particularly useful in the scientific and practical activities of Bulgarian specialists.

The basic works of P. S. Neporozhniy are devoted to the electrification of the USSR, the acceleration of scientific and technical progress in power and power construction, and the generalizing of Soviet and international experience in these areas.

As the chairman of the CEMA electric power commission, he has made a great and direct contribution to the beneficial role of the organization in the development and joint work of the Joint Power Systems.

The significant diverse activities of the Soviet minister have been marked by numerous state prizes. On his 70th birthday, he was awarded a new, highest state distinction, the Order of Lenin.

The editorial board of the journal ENERGETIKA, in expressing feelings of profound respect and gratitude on the part of Soviet power workers for the USSR Minister of Power and Electrification, Petr Stepanovich Neporozhniy, cordially wish him long years of good health and many new creative successes for the good of the fraternal Soviet country and for strengthening and broadening the fine, tested and eternal friendship between the Bulgarian and Soviet peoples.

10272

CSO: 2200

FUELS

GAS INDUSTRY ACHIEVEMENTS UNDER TENTH FIVE-YEAR PLAN SUMMED UP

Moscow TRUD in Russian 22 Nov 80 p 2

[Article by USSR Ministry of Gas Industry and Hero of Socialist Labor S. A. Orudzhev: "The Gas Industry's Goals"]

[Text] During this five-year plan the gas industry, while being developed at an outstripping pace, was raised to a qualitatively new level. In 1979 nationwide gas recovery reached 406.6 billion cubic meters--more than double that of 1970.

The importance of this high-quality energy source and most valuable raw material, which accelerates technical progress and the pace of growth of the whole national economy, is exceptionally great. Economists have estimated that the use of gas in industry provides for an annual rise in labor productivity of more than 1 percent. Produced with natural gas are 93 percent of the steel and cast iron, 44 percent of rolled ferrous metals, 59 percent of the cement, and about 95 percent of the mineral fertilizer.

The gas industry has an important role also in solving the main socio-economic task--that of a further rise in the standard of living and the welfare of the Soviet people. Gas is going ever increasingly to the satisfying of municipal and household needs. At present more than 1,990 cities and towns, 2,844 urban-type settlements and 140,000 rural communities have been equipped for and supplied with gas. More than 190 million Soviet people are using natural and liquefied gas in the home at the world's lowest prices.

In 1976-1980 much work was done to raise the reliability of the gas supply for industrial enterprises and for communities. For this purpose we have continued to develop and improve the USSR Unified Gas Supply System. This interconnected complex of gas fields, underground gas storage, gas-treatment plants and distribution systems are joined by a ramified network of gas trunk pipelines totaling more than 130,000 km in length. During the Tenth Five-Year Plan such long-distance high-capacity transport arteries as the Urengoy-Surgut-Chelyabinsk, the Urengoy-Medvezh'-ye-Punga-Ukhta-Torzhok-Minsk-Ivantsevichi-Dolina and the Chelyabinsk-Petrovsk-Novopskov pipelines, the second strand of the Nizhnyaya Tura-Perm'-Kazan'-Gor'kiy gas pipeline, the Nizhnevartovsk gas-treatment plant-Parabel'-Kuzbass and the Tryazovets-Leningrad and other gas pipelines were connected into this system, in close collaboration with Minneftegazstroy [Ministry of Construction of Petroleum and Gas Industry Enterprises] collectives. The socialist countries that belong to CEMA built, by joint efforts, the special Soyuz pipeline system, over which Orenburg

natural gas is delivered to these countries. Large-capacity production facilities for the integrated preparation of gas were built and put into operation.

During the modern era the main efforts have been focused on developing the gas and gas-condensate fields of West Siberia, where the industry's main raw materials base has been concentrated. This region is situated thousands of kilometers from the consumption centers, and the natural and climatic conditions are very difficult. Here, thanks to the joint heroic labor of collectives of gas-field workers, builders, power-engineering workers, and people of many other vocations, a gigantic regional production complex has been created and continues to take shape, where daily more than 440 million cubic meters of natural gas are recovered—more than a third of the recovery thereof nationwide. Simultaneously, most important measures for intensifying the construction of housing and of facilities for social, cultural and everyday-living purposes contemplated by the party and the government are being accomplished.

The gas-and-chemical subbranch, which is engaged in the integrated processing of natural gas, was successfully developed during the Tenth Five-Year Plan. The Orenburg gas-and-chemicals complex, at which more than 45 billion cubic meters of gas is recovered and treated annually, with the acquisition of 2.3 million tons of stable condensate, more than a million tons of elemental sulfur and other valuable types of raw materials for chemicals and petrochemicals, is the largest enterprise of this type. In all, 65 billion cubic meters of gas are being processed per year nowadays at such enterprises of our industry.

A problem of major national economic importance on which gas workers are toiling persistently is development of the oil and gas resources of the continental shelf. A long-range comprehensive program of operations has been adopted and is being implemented. It calls for the introduction of modern technical equipment for drilling and operating wells at sea depths of up to 200 meters. The fulfillment of this program will promote the wide attack that is to be waged in the next few years on the oil and gas riches of underwater stores, in order to place them at the service of the motherland. The successful results of the underground explorers, which have revealed recently a number of oil and gas fields in the water areas of the Caspian and Black seas, and also on the shelf of the Island of Sakhalin, will allow new discoveries to be hoped for.

During recent years of the five-year plan, radical qualitative shifts have occurred in supplying the gas industry with new industrial equipment. New operating equipment of increased reliability and unit capacity, produced in integrated modularized versions, is being used widely at gas fields and in gas-transporting systems. This will enable the level of industrialization of construction to be raised considerably and the time required for introducing gas-recovery and gas-transporting enterprises into operation to be shortened. For example, by using integrated modularized installations for the integrated preparation of gas, the time for building up the gas fields has been cut in half.

Improvement of the management and organizational structure and the introduction of new equipment have enabled an economic benefit of almost 250 million rubles to be obtained during the Tenth Five-Year Plan alone. In so doing, more than 10,000 workers, engineers and technicians were released provisionally.

Socialist competition aimed at searching for and putting to use unused reserves and at raising production effectiveness and work quality has been a mighty lever for multiplying labor successes. According to the results of this competition in 1979, collectives of Orenburggazprom [Orenburg Gas Industry Association], Nadymgazprom [Nadym Gas Industry Association], Shatlykgazdobycha [Shatlyk Gas Recovery Association], Mostransgaz [Moscow Association for the Transport and Delivery of Gas], the Association imeni 22d CPSU Congress and VNIPIgaz [All-Union Scientific-Research Institute for the Preparation of Natural Gas for Transport and Processing] were awarded challenge Red Banners of the CPSU Central Committee, the USSR Council of Ministers, the AUCCTU and the Komsomol Central Committee, and five of them were recorded on the All-Union Honor Plaque at VDNKh SSSR [USSR Exhibition of Achievements of the National Economy]. Since the start of the five-year plan 3,460 workers have been awarded orders and medals, and the high title of Hero of Socialist Labor was conferred on 5 of them. Comrade L. I. Brezhnev, in a letter of greeting in connection with the industry's fulfillment of the four-year production program ahead of schedule, gave a high evaluation to the gas-field workers' labor. This stimulated a new uplift of labor enthusiasm on the part of all our industry's collectives.

In response to the decision of the June 1980 CPSU Central Committee Plenum and the CPSU Central Committee decree, "On Socialist Competition for a Proper Greeting to the 26th CPSU Congress," the collectives of gas-industry associations and enterprises adopted higher commitments.

Orenburggazprom, Nadymgazprom, Turkmengazprom [Turkmen Gas Industry Association] and Ukrgazprom [Ukrainian Gas Industry Association] collectives, which have carried out the five-year plan and have recovered the largest amounts of gas above the plan, are at the head of the preCongress competition that is being promoted everywhere in our industry. In all, Mingazprom [Ministry of Gas Industry] enterprises recovered more than 4 million cubic meters of gas above the plan in the first 10 months of the year.

Successful realization of socialist commitments will enable the maximum level of gas recovery of 435 billion cubic meters, which was called for at the end of the five-year plan by decisions of the 25th CPSU Congress, to be reached.

All our industry's workers received the decisions of the October 1980 CPSU Central Committee Plenum and Comrade L. I. Brezhnev's instructions about the need for rapid increase in the country's gas recovery, primarily through the forced development of West Siberia's gas industry, as an urgent program for action. During the forthcoming five-year period, the branch's development will follow a new path for the further improvement of all the qualitative and quantitative indicators of the work, based upon reequipping of the industry technically, with progressive equipment and means of automation.

11409

CSO: 1822

FUELS

AZERBAIJAN OIL, GAS ACCOMPLISHMENTS REVIEWED

Baku AZERBAYDZHANSKOYE NEFTYANOYE KHOZYAYSTVO in Russian No 9, Sep 80 pp 1-4

[Article: "On the Threshold of New Tasks and Accomplishments"]

[Excerpts] The famous collective of many thousands of oil workers and gas workers of our country marks its professional holiday on 7 September, the All-Union Day of Workers in the Oil and Gas Industry. The role of oil and gas production in increasing the efficiency of the national economy and in raising the economic might of the Soviet state is very great at present.

This year the workers of the branch are marking their traditional holiday in a situation of high political and labor progress. The workers of the oil and gas branch have accepted with great inspiration the decisions of the June (1980) Plenum of the CPSU Central Committee on convening the next 26th CPSU Congress, and the report at the Plenum of the CPSU Central Committee General Secretary, Comrade L. I. Brezhnev. In his report he stressed once more the importance of the fuel and energy problem, the need for increasing the efficiency of production and the quality of work, of accelerating scientific and technical progress, and of strengthening the labor discipline.

The period after the 25th CPSU Congress was marked by great labor accomplishments and major sociopolitical events in the life of Soviet Azerbaijan. The production of industrial and agricultural products that rises from year to year, and the steady growth in the qualitative indicators of the economy reflect the main trend in the development of the republic's national economy. These years are characterized by processes of perfecting the social structure, growth in the national welfare, and further blossoming of science and culture in Azerbaijan.

For all the years of the 10th Five-Year Plan the republic was among the winners of the all-union socialist competition and was awarded the challenge Red Banner of the CPSU Central Committee, the USSR Council of Ministers, the AUCCTU and the Komsomol Central Committee. The successes of the Azerbaijan workers have been noted by a high honor of the country, the Order of Lenin.

The republic's oil and gas extracting industry was further developed in the current five-year plan. A lot of work was done to equip and technically re-equip the offshore oil and gas extraction. In 4.5 years, more than 1.8 billion rubles were directed for this purpose. This is the same amount as in the previous 6 years. The Caspian oil workers received new, highly efficient floating rigs for drilling wells 6,000 m deep at sea depths up to 70 m, specialized ships for laying underwater oil

and gas pipelines and conducting geological exploration and engineering-surveying work, deep-sea stationary platforms for cluster well drilling, and a crane ship with lifting capacity of 2,500 T. The reserves of oil and gas have significantly increased and new fields are being developed.

The CPSU Central Committee and the Soviet government are giving constant attention and rendering enormous help to the development of the oil and gas industry. The capital investments directed towards these branches rise every year. They are equipped with new and more advanced equipment. The new oil and gas extracting work is developing at accelerated rates.

Based on a powerful production and scientific-technical potential, the oil and gas branches of industry continue to develop at confident rates that guarantee the ever rising demands of the national economy for oil and gas and products of their refining. In the last 4 years of the 10th Five-Year Plan the extraction of oil with gas condensate and of gas increased significantly.

The development of the oil and gas industry is closely linked to significant changes in the geographical arrangement of the oil and gas industry enterprises. Thus, the specific weight of West Siberia in the total extraction of oil in the country rose from 9 in 1970 to 52% this year, while that of gas rose correspondingly from 4.6 to 37.4%. In a short period the West Siberian oil and gas complex has become the country's main fuel and energy base. In April 1978 the billionth ton of oil since the beginning of development of the West Siberian region was extracted.

At the same time one should note that a significant place in the total volume of oil and gas production belongs to the "old regions," Azerbaijan, Ural-Volga region, Central Asia, North Caucasus and others.

Although with today's giant scales of development of the oil and gas extraction, the specific weight of the Azerbaijan oil industry in the total volume of extraction for the country is not great, it is gratifying to note that the total oil extraction for the republic is increasing each year.

One of the distinguishing features of the current development of the oil industry is the ever rising role of offshore water areas.

By right Azerbaijan is considered to be the pioneer in developing offshore oil and gas fields. A large part of the oil extraction, roughly 70%, and the main volume of gas extraction in the republic occurs in the offshore oil and gas fields. They are being developed, built up and operated on the basis of the leading equipment and technology.

We have large reserves for growth in the rates of drilling, decrease in the accident rate, and reduction in the entire well construction cycle. This is indicated, in particular, by the experience of such drilling enterprises as MURB Bulla, the Gobustan UBR [administration of drilling operations], etc. The broad use of the achievements of scientific and technical progress, the leading methods of labor organization, and the ability to work productively with the maximum output, each day and each hour, these are the very factors that can result in success for all the collectives of the enterprises of the republic's oil and gas extracting industry.

From the results of 8 months of work for 1980 one can note that the collectives of the republic's oil and gas workers have overfulfilled a number of the main indicators.

During the elapsed period the associations Azneft' and Kasporneftegazprom implemented a lot of work to intensify extraction, and improve the engineering work on the active well fund, and the efficiency of the major repair and maintenance of the wells.

Two hundred and sixty idle wells were restored to activity, and over 19,000 geological and technical measures were taken to guarantee a considerable rise in oil extraction.

A lot has been done by the oil and gas extractors to perfect the equipment and technology of drilling and operating wells, for mechanization and automation of the production processes, and for introduction of automated control systems and complex systems of quality control.

The Azneft' association has successfully coped with the fulfillment of the plan for total volume of product production. It provided an additional gross product of 250,000 R. Assignments were fulfilled for labor productivity in industry and for the net cost of the industrial product.

In order to reveal new productive oil and gas fields, exploration and geological surveying work is currently underway in the central and western regions of the republic. Promising geological data on some of these areas have already been obtained which show their outlook.

The offshore oil and gas extractors, in the past 8 months have overfulfilled the plan for gas extraction by 340 million m³, and the production of gross products by 25 million rubles. Products totalling more than 4 million rubles have been realized in addition to the plan. Labor productivity in industry rose by 2.3% versus the planned. The planned assignments were successfully completed for starting up the main funds and for the volume of construction-installation and repair-construction work.

COPYRIGHT: Azerbaydzhanskoye Neftyanoye Khozyaystvo, 1980

9035

CSO: 1822

FUELS

MANGYSHLAK FUEL, ENERGY PROBLEMS LISTED

Alma-Ata NARODNOYE KHOZYAYSTVO KAZAKHISTANA In Russian No 8, Aug 80 pp 33-36

[Article by V. Savchenko, secretary of the Mangyshlak obkom of the Kazakhstan Communist Party: "Stages in Formation and Growth"]

[Excerpt] Difficulties are encountered in developing the newly discovered fields. Oil deposits on the Buzachi peninsula are at a shallow depth (300-900 meters). It would seem that a well could be drilled and the oil taken. But if extraction is organized in this way, only a small part of the available reserves can be extracted. This oil is highly viscous with a large content of resinous substances. This field can therefore only be worked with the help of advanced methods for modifying the bed. For example, it is planned to organize extraction using deep-well wet combustion, as well as steam-heat modification of the bed. However the level of technological readiness is still low and construction work is going slowly. There is another complexity because now only experimental sections are being prepared. It will be necessary to accumulate definite experience of operation, and at the same time, to prepare for working the entire Karazhanbas field.

It was decided to pump polyacrylamide-thickened water into the bed at the Kalankas field. However, the drilling of the injection wells and their preparation for operation are still going slowly.

All of these problems require a comprehensive solution on the part of the USSR Ministry of the Petroleum Industry.

One of the complicated problems in developing the territorial-production complex is supply with energy resources. One should note here that from the very foundation we are working by supplying ourselves with all types of power. In recent years a lag has been noted in the development of power engineering as compared to the growth in industry and in the population of the oblast.

The party, soviet, and economic agencies, after extensively studying the situation of electricity supply for the developing complex, took measures for its efficient use, for construction and introduction of new power engineering facilities. Construction has begun on the Shevchenkovskiy GRES. The start-up of the first unit is planned for 1982. Now it is up to the Ministry of Power and Electrification to guarantee the timely delivery of the equipment for this most important facility according to the construction schedule. It is necessary to accelerate the construction of the next plant units.

The guaranteed, reliable operation of the electrical circuits and substations acquires especial importance in the sharp continental climate of Mangyshlak with its frequent dust storms. The Mangyshlak enterprise of electrical circuits of the "Gur'evenenergo" administration is fulfilling this task poorly. It is enough to say that the losses of oil in 1979 from emergency cut-offs alone were about 30,000 T. The Kazakh SSR Ministry of Power and Electrification apparently needs to create a separate administration for the Mangyshlakskaya oblast, or at least, to guarantee the normal operation of the extant enterprise, and supplement it with equipment and personnel.

The question of water supply for the oblast has recently been raised with new acuteness. Whereas in the beginning of the five-year plan the needs of industry and other branches of the economy for fresh water were satisfied, today the situation has become significantly more complicated. A schedule for restricting the water supply has been introduced in the settlements in the summer.

All of these problems require detailed working out in the appropriate union ministries, and the involvement of considerable material resources. The development of the complex will be impaired to a considerable measure without their timely resolution.

There are many unsolved problems in the development of the fishing and fish processing branch. On the one hand, the main funds of the "Mangyshlakrybkholodflot" administration long ago became obsolete and worn out, while on the other hand, there are free labor resources in the city of Fort-Shevchenko. The time has come for complete reconstruction of this enterprise, and for the construction of a new fish processing complex. However the fish industry association "Kaspyba" of the USSR Ministry of the Fish Industry is slow to solve these problems.

Further development of the territorial-production complex is linked to an increase in the freight traffic that surpasses the potentialities of the main Makat-Uzen' railroad. It remains to implement a large complex of reconstructions of plants, tracks, and the repair base. It would be appropriate to set up a Mangyshlak department of the West Kazakhstan railroad.

The future of Mangyshlak's oil is linked primarily to the further intensification of geological exploration for oil, gas and other minerals. For this purpose deep exploration should be done in the Permian deposits. It remains to obtain a clear picture of the oil content of the Caspian Sea shelf. One can say with complete confidence today that part of the discovered fields are under the sea. The time has come to refine part of the oil locally. This will permit a full supply of raw material to the plastics plant, and will create conditions for the further development of the enterprises of the chemical industry.

COPYRIGHT: "Narodnoye khozyaystvo Kazakhstana", 1980

9035
CSO: 1822

AUTOMATED SYSTEM OF SCIENTIFIC INFORMATION AIDS OIL INDUSTRY

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 7 Oct '80 p 2

[Article by A. Mit'ko: "Everything about Oil"]

[Text] A great event has occurred in the All-Union Scientific Research Institute for the Organization, Control and Economics of the Petroleum and Gas Industry. The automated system of scientific and technical information of the branch (ASNTI) has been put into industrial operation considerably earlier than the planned period. The leader of the program, deputy director of the institute, A. Smirnov, relates:

"A mass of the most diverse literature is published on questions of oil and gas extraction. We receive about 100 foreign special journals on this theme alone. The total number of copies of the institute's own publications is about a million per year. This is why the first goal of our system is to reach the maximum specialization and differentiation of the information materials, accelerate the processing of the incoming data, and rapidly search for and deliver the necessary information to the most distant field or borehole. The next stage is to help to introduce innovations and the leading experience. Automation of the least creative, routine operations plays an invaluable role in solving these problems."

This occurred at one of the distant boreholes. A formation shifted at a great depth, and the multiple-meter column of drilling pipes stopped. "Freeze" is the name for this fairly common phenomenon.

The Soviet scientists succeeded in inventing a vibration-impact method for controlling freeze only recently. They were helped in this solution by the workers of the branch service of scientific and technical information who supplied all the primary information in this area.

One of the developers of the automated system, mathematician Aleksandr Lishanskiy characterized his brainchild thus: "This is a complicated tool that permits storage and removal from storage what is necessary at any moment."

When one speaks of "storage" then usually one imagines shelves stretching to the ceiling, filled with books and portfolios with documents. There is nothing like this here. The people process the information materials, condense them and after transferring them to punched tape they enter them into the data bank of a computer.

The institute has computed that over 30% of the time of the engineers and scientists who are working on problems of accelerating scientific and technical progress in the extraction, transporting and storage of oil is saved by the conveyer of scientific and technical information that is equipped with modern computers. The principle of priority in serving the customers from the leading edge of today's battle for oil is laid in the automated system.

We will briefly discuss the economics of this matter. The information service is profitable. In the last 2 years alone the efficiency from introducing the innovations taken from the materials of scientific and technical information was a million rubles in the branch.

The automated system of scientific and technical information of the Ministry of the Petroleum Industry is one of the many similar branch systems that are currently active in the country. Together with the territorial and specialized data banks they comprise the basis for the State Automated System of Scientific and Technical Information that is currently being created.

9035

CSO: 1822

GAS PIPELINE TRANSPORT, CORROSION PROBLEMS DISCUSSED

Corrosion Causes Failure

Moscow GAZOVAYA PROMYSHLENNOST' in Russian No 10, Oct 80 pp 2-3

[Article: "Complete Protection From Corrosion"]

[Text] The conference of gas transportation associations in Cherkassy that was organized by the central agency of the Ministry of the Gas Industry was an important stage in the further perfection of control over production, increase in the reliable operation of equipment and labor efficiency.

The purpose of the conference was to exchange leading experience in solving the most important problems of economic, organizational, technical and other forms of activity of the associations.

The conference program that was approved by the deputy minister of the gas industry, S. S. Kashirov, reflected the efficient practice of developing the gas transport subbranch. The conference participants were able to become acquainted with the best experience of organizing socialist competition, introducing new equipment, perfecting the economic activity of the enterprises, strengthening the labor discipline, and developing creative activity in the collectives of the gas transport associations.

We are publishing here a conversation between the journal correspondent and the conference participants: deputy minister of the gas industry, S. S. Kashirov, and heads of the production associations for transportation and delivery of gas V. N. Luzyanin (Gor'kiytransgaz), A. I. Safronov (Mostransgaz), S. F. Barmin (Lentransgaz), deputy head of Ukgazprom N. Yu. Shcherba and head of the planning department of Lentransgaz I. M. Zhigalova.

[Question] In order to guarantee the reliable and efficient use of the linear section of the main gas pipelines the branch is conducting purposeful work to improve the planning work, increase the quality of construction, perfect the protection of pipes from corrosion, for a higher quality preparation of gas for transporting, and increase in the degree of equipping and mobility of the repair-restoration services and qualification of the personnel. At the same time there are still high losses of gas due to accidents on the linear section of the gas pipelines.

Sergey Stepanovich, in your opinion what are the main reasons for the temporary stoppage of gas supply on individual gas pipelines, and what is being done to guarantee high reliability in the gas supply system?

[Answer] The number of breaks in 1979 as compared to the previous year dropped 1.3-fold. However it is still high. About 80% of the accidents caused by pipe breaks occurred in 1979 during the operation of the main gas pipelines.

Analysis of the breaks shows that the main cause of the accidents is external corrosion in the gas pipeline metal. The greatest number of breaks from external corrosion occurred in the associations "Saratovtransgaz," "Sredastransgaz" and "Soyuzuzbekgazprom" on the gas pipeline systems Central Asia-center of the country, Bukhara-Urals and the Tashkent system.

It should be said that external corrosion mainly occurs where the pipe insulation is weak, where the use of electrochemical protection is delayed, and where not enough attention is paid to the use of these resources.

When gas pipelines are laid, regardless of the constant perfection of construction organization and the use of advanced technology and special equipment, the insulation coating of the pipes can be damaged, for example, by the laying of gas pipes in trenches with hard rocks without sprinkling soft ground under it.

The degree of gas pipe protection from corrosion at the end of last year averaged about 90%, which is clearly insufficient.

In the majority of associations, the degree of protection of the gas pipes from corrosion increased in the past year, but in the associations "Zapadtransgaz" and "Eksporttransgaz" it was brought to 100%. At the same time, as compared to last year, the degree of protection was reduced in the associations "Uraltransgaz," "Ukhtatransgaz," "Aztransgaz," "Uzbektransgaz" and in a number of others.

By analyzing the reasons for the failures in the operation of the cathode protection units one can draw the conclusion that they are mainly linked to the lack of electrical supply. At the same time, the units of electrochemical protection malfunction for the following reasons:

insufficient frequency of inspections and maintenance of the units and power transmission lines,

shortage of personnel in the electrochemical protection services,

insufficient quantity of special equipment (electrochemical protection laboratories, caterpillar transporters, excavation equipment, drilling equipment and trucks of improved navigability).

In recent years considerable work has been done to strengthen the anticorrosion protection of the main gas pipelines:

a new power composition for insulating pipes under plant conditions was made and passed on for industrial use;

in 1979 the Volga Pipe Plant manufactured a large batch of pipes 1020 mm in diameter with epoxy coating;

a LXX-1 type mobile laboratory was developed for quality control in welding and insulation coatings during repair-restoration work;

TKZ-4 equipment, high-resistance gage of protection potentials, set of instruments for finding damages to the insulation coatings of the gas pipelines have been developed and are being introduced;

introduction of an improved modification of cathode protection stations of several types has begun;

a lot of work has been done to regulate the standard technical documents.

In order to solve the problem of reaching and reliably maintaining 100% protection of the active main gas pipes from corrosion it is necessary to create 530 cathode protection units, 1180 anode grounding electrodes, to construct over 1500 km of overhead power transmission lines, set up and put into operation over 140 sets of remote control devices, and restore and construct over 10,000 control and measuring points in the near future.

It is expedient to isolate the groups of electrochemical protection in independent sections. This was done, for example, in the LPU [expansion unknown] of the associations "Nadymgazprom," "Volgogradtransgaz" and "Sredaistransgaz." The groups or departments of electrochemical protection must evidently become independent in the apparatus of the associations. This has been done in 10 associations so far.

According to the currently extant practice the degree of protection of the gas pipelines from corrosion is evaluated twice a year, in the spring-summer and fall-winter periods. This is apparently insufficient.

Due to the frequent change in corrosion conditions, the real protection of the gas pipelines is considerably lower than that presented in the reports.

For a more objective and accurate evaluation of the degree of protection the associations must make a check of the efficient operation of the units no less than 4 times a year, and additionally control the operation of the units and condition of the network of underground metal structures and sources of stray currents. The GOST provides for this check. For this purpose it is necessary to make all possible use and to introduce into practice the systems of remote control of the electrochemical protection units operation, as well as the latest achievements of science and technology, for example, equipment and devices based on microelectronics.

COPYRIGHT: Izdatel'stvo "Nedra" "Gazovaya promyshlennost'," 1980

Gas Transport Cost Reductions

Moscow GAZOVAYA PROMYSHLENNOST' in Russian No 10, Oct 80 pp 11-12

[Article: "Reduction in Net Cost of Gas Transport"]

[Question] The net cost of transporting gas is, perhaps, the most sensitive indicator of an association's operation to transport and deliver gas.

A change in its size is influenced by the condition of the throughput of the gas pipe, constant perfection in organization of labor, production and control, introduction of new equipment, automation and remote control of production and a number of other factors. One can say that practically all the production measures have a certain effect on net cost.

In this respect, the planning of net cost that is thoroughly substantiated by technical and economic calculations, and the constant detection and mobilization of internal reserves to reduce it are the most important tasks of all the workers in our branch.

Irina Mikhaylovna, please tell us how this work has been set up in the association "Lentransgaz"?

[Answer] The main trend for reducing the net cost in our branch is an increase in the volume of gas transporting, since the specific weight of the constant expenditures is about 60%. In this respect, when the volume of transported gas is increased, the net cost is reduced even without saving outlays for individual articles.

The primary factors for increasing the gas pipe output are laid already in the stage of pipe planning and construction. This is construction of gas pipes of large diameters with increased working pressure. The economic efficiency of such construction is known to everyone.

There are considerable reserves for increasing gas pipeline output even in the gas pipes that are in operation.

The most important reserve is to bring the actual gas pipeline output up to the rated. Our association is focusing special attention on this problem. A whole set of measures have been taken in recent years that are linked to the redistribution of gas flows by cyclization of the gas pipe systems, construction of loopings and reconstruction of production plans for compressor stations. As a result of these measures the charging coefficient of gas pipelines on the section Belousovo-Torzhok rose by 23%, and in the Ukhta-Torzhok gas pipe system by 3%. On the whole for the association the charging coefficient of the gas pipelines in 1979 reached 87% versus 75% in the beginning of the five-year plan.

For our system, an increase in the gas pipeline output by 1% without additional capital investments yields a saving of outlays for constant expenditures of more than 300,000 rubles and over 600,000 rubles of profit.

An increase in the loading of the gas pipelines in the current five-year plan (by putting into operation new compressor stations and loopings) allowed the association to obtain an annual saving of outlays for constant expenditures of about R 2 million.

A more thorough preparation of the gas for transporting at the fields, periodic cleaning of the gas pipe, timely elimination of unsound spots, and accident-free operation of the linear section of the gas pipelines and compressor stations permit avoidance of a reduced throughput. The associations have successfully mastered the cleaning of individual sections in the gas pipelines without stopping the gas flow. No less than 200-300 km of gas pipes are cleaned every year. This not only

increases the output of the gas pipes, but also saves material outlays totalling R 50,000.

An important role in increasing the throughput is played by leveling the seasonal nonuniform gas consumption, and by the related development of underground reservoir systems. In order to increase the output of the underground storehouses the Gatchina underground gas storehouse has introduced a hydraulic blockade that reduced the annual gas losses in the storehouse to 15 percent of the total volume of active gas.

The association is focusing a lot of attention on conserving outlays for transporting gas, and especially the energy expenditures. The specific weight of these outlays in the net cost is over 30%.

The selection of the optimal operating pattern for the gas pipeline system and compressor stations is the main trend in reducing the energy outlays.

In this area it is very important to have a stable gas transfer pattern after excluding the additional energy expenditures associated with starting and stopping the gas transmission units. When there is an unstable pattern the dispatcher services make exaggerated claims for electricity to attain the maximum load. As a result the energy systems are paid surplus for the connected power.

The selection of the gas transmission pattern still does not always correspond to its efficiency. In the quest for an increase in the gas pipe pressure by 0.5 kg-f/cm² additional units are engaged, gas and electricity are consumed inefficiently. This reaches tens of thousands of rubles.

The operating pattern of the gas pipeline is often determined by the TsDU [Central Dispatcher Administration of the United Energy System of Socialist Countries] by reducing the role and the effect on the pattern of the dispatcher's services of the association. It would be more correct, on the contrary, to increase the role of the pattern groups of the dispatcher services in the associations after leaving the TsDU the right to control and define the patterns only at the final compressor stations for the associations.

The association has introduced a whole series of measures for saving energy outlays: the use of synchronous electric motors and maintenance of the power factor on the optimal pattern (the annual discount in the energy systems is about R 150,000); improvement in the operation of cooling towers, increase in the coefficient of heat output, efficient use of fan units, reduction in test start-ups, the use of the heat from exhaust gases, etc. Of course, an increase in the reliable operation of the gas transmission unit, i.e., reduction in the forced and emergency stops is important.

As a result of the work that has been done in 4 years of the five-year plan the association has a saving of gas for in-house needs of 162 million m³ and of electricity about 120 million kw-h.

A constant reduction in the labor outlays as a result of introducing scientific organization of labor, production and control has great importance in decreasing the net cost of transporting gas. The use of the Shchekinskiy method has special effectiveness here. It permits work to be done with a lower number of service

personnel. The introduction of the Shchekinskiy method is promoted by the active time system of wages, placement of the work force in accordance with servicing equipment, and the extant brigade form of organizing labor.

There are about 320 workers in our association on the expanded zone of servicing, and 190 of them have plurality of professions. Twenty-twenty five people are released every year. Since the beginning of the experiment 256 people have been released, including 105 since the beginning of this five-year plan. As a result the annual savings for the wages fund reached 120,000 rubles, of which almost half goes to pay additional wages to the workers.

COPYRIGHT: Izdatel'stvo "Nedra" "Gazovaya promyshlennost'", 1980

9035

CSO: 1822

UDC 022.276.51.05

GUSHER EQUIPMENT DEVELOPED FOR HIGH-PRESSURE, AGGRESSIVE WELLS

Moscow GAZOVAYA PROMYSHLENNOST' in Russian No 10, Oct 80 p 15

[Article by T. K. Veliyev, V. A. Rasulov, Z. G. Napetvaridze, A. A. Arutyunyan, and K. B. Aliyev (AzINMASH) [Azerbaijan Scientific Research Institute of Petroleum Machine Construction]: "New Gusher Equipment"]

[Text] The developed gusher equipment will be widely used to build up the producing and development wells of the oil and gas fields that are characterized by high formation pressures and aggressiveness of the media.

Intensive, deep drilling is being done in different regions of the country in order to find new areas with productive oil and gas beds. New areas have been explored at the fields of the associations "Ukrgezprom," "Uzbekgezprom," "Turkmengezprom," "Ukrneft'," "Uzbekneft'," "Grozneft'," and "Nizhnevolzhskneft'" that are characterized by high formation pressures (up to 700 kg-f/cm²) and the presence in the medium of such aggressive components as hydrogen sulfide and carbon dioxide. The development of these areas has great national economic importance, however, the presence of H₂S and CO₂ in the medium together with high pressure and deposit water promotes a higher rate of corrosion and destruction of metals and other materials. The use of field gusher equipment in the standard material design put out by the country's machine construction enterprises is not possible under these conditions. This made it necessary to make special corrosion-resistant head gusher equipment.

The AzINMASH in accordance with the requirements of the customer, the Ministry of the Gas Industry, formulated a technical assignment for equipment that is characterized by the following design and technical features:

cross plan of equipment - No 6 (GOST 13846-74);
working pressure 700 kg-f/cm²;
diameter of passage through shaft 80 mm, on lateral branches of the gusher network and pipe head 65 mm;
cut-off devices--direct flow slide valves with automatic lubrication and counter-balanced mandrel;
upper central shaft remotely-controlled slide valve;
on the lateral branches of the gusher network, after the slide valves with manual drive there are slide valve-cut-offs to automatically cover the stream of working medium on the cross braces in case of an accidental increase or decrease in the pressure in the loop;

the operating pattern of the well is regulated by an angular controllable throttle; the pumping-compressor pipes ϕ -114 (or ϕ -89) are suspended on a coupling suspension of the pipe head; the diameters of the suspended casings are 178, 245 and 324 mm; the suspension method is on cotter pins.

It is necessary to note that the AzINMASH previously developed head gusher equipment for the Orenburg gas condensate field that also contained H_2S and CO_2 in the medium, but was characterized by formation pressure up to 180 kg-f/cm².

Taking into consideration the features of the new fields, the institute conducted a lot of scientific research work to select the materials, determine the patterns of thermal treatment, welding, etc. during the making of the equipment for working pressure up to 700 kg-f/cm².

Together with the S. Shaumyan Leningrad Petroleum and Oil Plant, the institute made a new packing grease for aggressive media. Tests revealed its high operational qualities.

According to the recommendations for material design, the institute, jointly with the plant "Krasnyy molot" (Groznyy) developed the working documents for the gusher equipment AF5-80/65x750K2 and the equipment for connecting the casing columns OKK2-700-178x245x324K2 (KG-3x700K2).

The developed equipment corresponds in its technical and operational parameters to the modern technical level.

In 1978 the experimental model of the equipment for connecting the casing columns OKK2-700-178x245x324K2 (KG-3x700K2) produced by the plant "Krasnyy molot" was installed in well 40 of the Urtabulak field. The installation and testing of the connecting equipment occurred without any complications. An inconvenience was only noted in the installation due to the use of chevron sleeves made of ANG material as the packers.

In early 1979 this well, equipped with the gusher equipment AF5-80/65x700K2 also made by the plant "Krasnyy molot", was put into operation. At the moment of start-up the well parameters were: $p_{\text{затрыб}} = 125$ kg-f/cm², $p_{\text{стат}} = 160$ kg-f/cm², $p_{\text{глуб}} = 150$ kg-f/cm², H_2S content 5.3% and CO_2 content 5.6%.

Despite the fact that the working pressures in the well were considerably lower than the planned parameters of the tested equipment, and taking into consideration the high percentage content of H_2S and CO_2 that were observed for the first time in the practice of operating domestic head equipment, a decision was made to continue the tests.

In May 1979 intermediate tests were made of the gusher equipment. During these tests individual shortcomings were found that were mainly associated with the quality of fabrication.

After elimination of the shortcomings the tests were continued. Their results confirmed the correctness of the designs and materials used in the equipment.

In December 1979, in accordance with the order of the interdepartmental commission, an inspection was made of the gusher equipment and the equipment for connecting the casing columns. The commission recommended the development of series production of the equipment.

COPYRIGHT: Izdatel'stvo "Nedra" "Gazovaya promyshlennost'", 1980

9035

CSO: 1822

TYUMEN' MEETING STRESSES STEPS TO IMPROVE OIL-WELL DRILLING, CONSTRUCTION

Moscow NEFTYANOE KHOZYAYSTVO in Russian No 9, Sep 80 pp 57-59

[Article by A. I. Botkilin and A. P. Retyunin: 'Raising Drilling Effectiveness and Well-Construction Quality at West Siberian Oilfields']

[Text] A joint expanded conference of two oil and gas well-drilling sections of the Minnefteprom [Ministry of Petroleum Industry] NTS [Scientific and Technical Council] and the Central Administration of the NTO NGP [Scientific and Technical Society of the Oil and Gas Industry] on the question of raising drilling effectiveness and well-construction quality at West Siberian oilfields convened at Tyumen' in March 1980.

Participating in the meeting were 130 people: specialists of drilling enterprises and production administrations and scientific-research and design institutes and members of oil and gas well-drilling sections of Minnefteprom, the Central Administration of the NTO NGP imeni Academician I. M. Gubkin and the NTO NGP's of Tyumenskaya Oblast primary organizations.

The conference's participants listened with great interest to the report of M. N. Safiullin (Glavtyumenneftegaz [Main Administration of the Oil and Gas Industry of Tyumenskaya Oblast]), 'Ways to Raise Drilling Effectiveness and Quality in Western Siberia.' The reporter noted the major achievements of Glavtyumenneftegaz collectives, particularly wide introduction of the rotating-party method for drilling operations, which is being adopted on an increasingly wider scale, the organization of year-round drilling on swamp and submerged lands, and further improvement in the organization of production and the management of drilling work. M. N. Safiullin cited the drilling brigades' work results during 1979 and dwelt on existing deficiencies as well as on Glavtyumenneftegaz tasks in the area of site-preparation work and derrick-building that must be resolved jointly with the industry's scientific-research and design institutes.

V. M. Sherenberger (Glavtyumenneftegaz) threw light on questions of the status of drilling technology. He dwelt in detail on factors that affect a future rise in the indicators of drill-bit operation. An increase in penetration per drill bit is one of the most important reserves for raising the technical and economic indicators for drilling and for output per brigade per year. In 1980, jointly with the production associations, Glavtyumenneftegaz worked out and has been implementing during drilling technological and equipment measures for raising the indicators for drill-bit operation.

A. N. Voyevod examined the status of and prospects for progress in derrick-building in Glavtyumenneftegaz. In this area, the organization, equipment and technology of operations are being improved, and new engineering solutions have been found for the West Siberian environment. For the first time, Glavtyumenneftegaz adopted the policy of establishing specialized organizations--derrick-erecting administrations and offices. Derrick-building is being developed under a single engineering program, using accumulated experience and the advanced achievements of science and technology.

P. N. Grigor'yev of SibNIINP [Siberian Scientific-Research Institute of the Oil Industry] delivered the report, "Fluids for Drilling Wells at West Siberian Fields." He described the rheological properties of drilling muds and recommended four reactants for improving them while drilling below the surface casing and permafrost.

V. I. Krylov (VNIIOKRneft' [All-Union Scientific-Research Institute of Oil-Well Casing Operations]) named in his report, "The Status of and Ways to Improve Plugging Materials and the Technology of Casing Work and of Insulation Repair in Wells in the West Siberian Environment," tasks for raising the quality of the casing of wells, which require that a set of measures be developed and introduced. New developments were noted: the reactant PVS-TR (copolymer of polyvinyl alcohol) is an effective reducer of water loss in cementing slurries and a stabilizer and a polymer plugging material which is based on the resin VK-1M. The reporter examined new trends in operations in the area of plugging materials with a controlled OZTs [waiting-for-cement-to-harden] period.

A. V. Orlov (VNIIBT [All-Union Scientific-Research Institute for Drilling Equipment]), in his report, "Ways to Raise the Effectiveness of Drilling in West Siberia," reported on the results of introducing new equipment developed by VNIIBT for Glavtyumenneftegaz drilling enterprises, and also about new drilling technology developed by VNIIBT, jointly with Glavtyumenneftegaz. The reporter examined urgent problems and tasks for improving drilling equipment and technology and for completing wells, and he proposed a work program for VNIIBT for 1980-1981 in the areas of: clustered slant and directional well drilling, electrical drilling, a rock-destroying tool, and the casing of wells.

After hearing and discussing the reports and papers, the participants of the expanded conference of the sections adopted a detailed solution, which noted that in recent years much work had been done in the industry to create and develop the West Siberian regional oil and gas production complex and that drilling work volume is increasing at a rapid pace. During the first 4 years of the Tenth Five-Year Plan about 18.88 million meters of rock had been drilled through in oilfields of Tyumenskaya and Tomskaya oblasts--twice as much as in the whole Ninth Five-Year Plan, and 7,384 oil wells had been erected.

The task of reducing well-construction time that was set by 25th CPSU Congress decisions is being carried out successfully. As a result of the organizational work that has been done, West Siberia's drillers have cut duration of the well-construction cycle from 71.2 days in 1975 to 42.9 days in 1979, or by 39.7 percent. Fifteen Glavtyumenneftegaz UBR's [drilling administrations], three Tomskneft' [Tomskaya Oblast Oil Industry Association] administrations and 10 contracting UBR's from 6 outside administrations are building wells here. During the Tenth Five-Year

Plan the total number of drilling brigades rose from 64 to 166, derrick-erecting brigades from 18 to 78 and well-completion brigades from 20 to 60.

Substantial results have been achieved in organizing the rotating-party method of drilling. In 1979 contracting organizations drilled through 1,386,960 meters.

The engineering base for drilling is being developed successfully, and well-construction technology is being improved. Improved BU-3000 EUC drilling installations for cluster-well drilling, highly productive bits, bottom-hole motors, and effective chemical reactants are coming into the drillers' armamentarium.

Major tasks for a further sharp increase in the amount of drilling during the concluding year of the Tenth Five-Year Plan, and especially during the Eleventh Five-Year Plan, will require the mobilization of all forces for a rise in the effectiveness and quality of drilling operations through an acceleration of scientific and technical progress, improvement of the economic mechanism, and more complete use of all production reserves.

The conference's participants examined in detail both inadequacies and the existing production reserves. Elimination of the first and realization of the second will enable a reliable base for the successful fulfillment of Eleventh Five-Year Plan tasks to be provided.

Thus, despite the high results achieved by the best drilling brigades, average penetration per brigade fell. In 1979 it was 45,600 meters for Glavtyumenneftegaz associations and 34,900 meters for contracting organizations. Out of 156 drilling brigades, 34 (21.8 percent) drilled more than 50,000 meters each and 83 brigades (53.2 percent) drilled less than 40,000 meters each. During the year the drilling brigades did not have a full workload. In Glavtyumenneftegaz, on the average, last year each of them spent 28.2 days in transit or preparing a cluster for drilling. When the string is not sealed, the drilling brigade is transferred from the well in question, because of which idle time for organizational reasons is increased substantially, and, despite the fact that a major portion of this time expenditure does not actually affect output per worker of drilling brigades, it has, however, led to a reduction in effective drilling speed from 3,766 meters per rig per month in 1975 to 2,815 in 1979.

In 1978 and 1979 conversion was made to a highly effective spectrum of jet bits equipped with hard-alloy of the III 215.9 MZ-GV and S-GN types, and new types of well-bottom motors--TSSh 1M1-195 TL, TSSh 1M2-195 TL, D2-195M, A7P3 and TRM-195--were developed and introduced. Drilling muds that use the effective chemical reactants GKZh-10, GKZh-11, KMTs-500-600 and KSSB were developed and introduced. The introduction of a three-stage mud-cleaning system was begun. However, these measures have only stabilized the main technical indicators (penetration per bit and mechanical drilling speed).

The quality of well construction is being raised by the introduction of a set of technological and equipment measures. The number of slanted wells that did not fall within the circle of tolerable deviation and the number of cases of additional revision of well-bore trajectory have been reduced; nevertheless, work must continue in this area, since the percentage of well-bore trajectory corrections and of wells that have not been brought within the tolerable-deviation circle still is quite great.

There are deficiencies in well completion that lead to complications and wastage when the wells are being cased and tested. As a consequence of violations of production and technological discipline by line-operating personnel during the preparation for the lowering of casing string and during well cementing, Glavtyumenneftegaz brigades in 1979 drilled 156 wells with wastage, including 89 wells with unsealed production strings. The work with the well inventory that requires insulation repairs is poorly organized, as a result of which there are more than 200 such wells with lowered production strings on drilling organization books. The number of wells that are eliminated for engineering reasons is not being reduced.

The problem of raising the construction quality, reliability and longevity of wells is one of the most important in West Siberia, and it requires a comprehensive solution. At the same time, drilling organizations still have not been fully provided with well-bottom motors, good quality chemical reactants, light-alloy drill pipe, equipment for surveying well-bore trajectories, equipment for cementing wells, good quality plugging materials, and cranes and transporting equipment. The casing provided does not meet the requirements of slanted and directional wells.

In the area of drilling-operations organization, the anticipatory building of areas under the drill is not being provided, and the construction of roads, cluster-well platforms, drilling bases, platforms for the assembly of new drill rigs, pipe centers, mechanized storage for the protection and preparation of free-flowing materials, and housing lags.

The rise in technical and economic indicators for drilling is impeded also by deficiencies in the work of associated enterprises and organizations that carry out various steps of well-construction work: site-preparation, derrick-erection, geophysical, plugging, transport and other operations. A reliable supply of production equipment for each drilling, derrick-erecting and well-completion brigade that guarantees that their work will be highly productive has not been arranged.

Attributing exceptionally great importance to further development of the West Siberian oil and gas production complex by raising well-construction effectiveness and quality, accelerating the introduction of wells into operation, the participants of the expanded conference of the sections for carrying out the decisions of the November 1979 Plenum of the CPSU Central Committee and the program instructions laid down in the greeting of Comrade L. I. Brezhnev to collectives of advanced Glavtyumenneftegaz drilling organizations, recommended that a series of specific organizational and technical measures be executed, beginning in 1980: in the area of organization of drilling (Glavtyumenneftegaz, Tomskneft', SibNIINP and VNIIOENG [All-Union Scientific-Research Institute for Organization of the Management and Economics of the Oil and Gas Industry]); in the area of work preparatory to drilling (Glavtyumenneftegaz and Tomskneft'); in the area of organization and technology of derrick erection (Glavtyumenneftegaz and Tomskneft'); and in the area of improving drilling technology and well-construction quality (Glavtyumenneftegaz, the production associations of Glavtyumenneftegaz and Tomskneft', VNIIBT, VNIKRneft', SibNIINP, VNI [All-Union Oil and Gas Scientific-Research Institute], and VPO Soyuzneftemashremont [All-Union Production Association for the Repair of Oilfield Machinery]).

COPYRIGHT: Izdatel'stvo "Nedra", "Neftyanoye khozyaystvo", 1980

FUELS

SLOW CONSTRUCTION WORK DELAYS KOMI OILFIELD DEVELOPMENT

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 14 Oct 80 p 3

[Article by V. Krukovskiy (Usinsk-Ukhta): "The Hypnosis of Objective Causes"]

[Text] Komneft' [Komi Oil Industry Association] has been in arrears about 100,000 tons since the start of this year.

"The main reason for the lack of success is the failure to put reservoir-pressure maintenance facilities into operation at the Vozey and other oilfield structures," chief of the production section of Komneft' V. Gorbatov believes. "Glavkomigaz-neftestroy [Main Administration for the Construction of Gas and Oil Facilities in the Komi ASSR] and its Usinsk trust have failed us considerably."

Yes, actually, Severpromstroy [Industrial Construction Trust for Northern Regions] builders have created at the Vozey oilfield literally a "peak-load" situation. Last year they should have turned over to the oilfield workers a ninth cluster-module pump station. But it has appeared only now. What does this mean? About 2 million cubic meters of water were not injected into the formation. As a result, pressure in it dropped, and this means direct losses in the recovery of crude oil.

Equipment worth 50 million rubles has accumulated now at the association's bases and storage facilities. The oilfield workers have sent everything, down to the last nail, as they say, for oilfield structures. But there is no place to put the equipment because of the lack of construction readiness of the facilities. The client himself will turn over to the builders, directly at the site, pipe for service and utility lines within the oilfield. If this matter will progress further, then the roles will be changed in a short time. But the situation is not improved by this: the list of facilities not turned over on time is still substantial. And behind each of them are many tons of lost crude.

And now the association's managers have sent this telegram to Mintransstroy [Ministry of Transport Construction: "Because of the failure of Perm'dorstroy [Perm'skaya Oblast Road Construction Trust] to build a road, the collective of Drilling Administration No 3 is idle. The drilling of 20 wells has been broken off, and 34 wells that had been drilled through back in the winter have not been readied for production because of the lack of roads. The daily loss of oil is 3,700 tons. Do something quickly."

All right, it turns out that the interdependent entities make a guilty circle? No, this is far from the case. In the association, work on the basic production resources of the oilfield workers, the wells, has weakened. In the first quarter about 50 wells at the oilfields were idle, and by September 93 were. Here they are, reserves for producing crude!

Such a situation is all the more intolerable against the background of successes of the penetrators of the northern earth. The Ubinsk Drilling Operations Trust passed the goal of 400,000 meters of penetration and turned over to the operators 10 wells above the plan. Shock work of the brigades of S. Melekhin, N. Dobryakov, T. Andguladze and others who are in charge of the competition of the drillers for a proper greeting for the 26th CPSU Congress made this result possible.

A strenuous working atmosphere has been created now at Komneft' oilfields, an a drive for unconditional fulfillment of the annual plan has been promoted. September indicated that the measures developed are being carried out successfully. During the month the collective reduced the arrears by 42,000 tons.

"We are confident," says A. Gumenyuk, general director of the association, "that before the end of the year, not only will we make up the whole arrears, but we will also create a good backlog of accomplished work for the Eleventh Five-Year Plan."

Well, it is necessary to work for this. Both the oilfield workers themselves and the numerous people whose work is linked with theirs.

11409

CS0: 1822

FUELS

CROSS-HAULING OF COAL, BUILDING MATERIALS MAKES TRANSPORT A BOTTLENECK

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 9 Oct 80 p 2

[Article by V. Selyunin, economic reviewer for SOTSIALISTICHESKAYA INDUSTRIYA: "Exceptions Without Rules"]

[Text] D. Melamed, chief of the Fuel Transport Administration of the Union's Minenergo [Ministry of Power and Electrification], clearly considered it beneath his dignity to retreat before sharp questions, to find others to respond. On the contrary, he was ready to bear the burden on his not-so-young shoulders:

"What kind of rational hauling do you call this? And if there were a railroad to Chukotka and coal were there, I would, without hesitation, send it to the Donbass [Donets Coal Basin]."

Coal is not yet being obtained from Chukotka. But there are other routings left to be discussed. Why are 11 million tons of coal sent out from the Ukraine each year and, simultaneously, more than 13 million tons are sent here from the Kuzbass [Kuznetsk Coal Basin], Karaganda and Zapolyar'ye? For what reason are more than 2 million tons of fuel sent out from Sverdlovskaya Oblast, from the Bogoslov open-cut mine, to Tyumen', Kirov and Tambov and to the Serovskaya GRES, which is located 43 km from the mine, while the importation of Ekibastuz coal is increasing so much? Why is it necessary to drag coal tailings from Cherepovets to Donets? Are deliveries of Siberian fuel to Arkhangel'skaya Oblast amenable to a reasonable explanation, while Inta coal travels to Zaporozh'ye?

Not relying upon common sense, I extracted all these examples from official documents. Some of the routes named are directly prohibited by the Interagency Commission on the Rationalization of Haulage, while others, by way of exceptions, were allowed for only 1 year. How was it possible for customers to bypass these strictures for several years?

One source with a knowledge of the matter explained how such ties had taken shape. He willingly admitted their irrationality, but the power workers' prohibition, in his opinion, was not bypassed; despite the fact that it was prohibited by the interagency commission, under USSR Gosplan, it was authorized by another Gosplan element—the Section of Inventories and Plans for the Distribution of Fuel. There they produce the funds and indicate exactly where such coal will be shipped, and so the power workers are only implementing the ordered routing.

Chief Specialist Ya. Gamlitskiy of the division named began his explanation with a question which was almost philosophical: just what is irrational haulage? And he himself answered:

"It is haulage that can be done without under given specific conditions."

But later on, everything was understood. Is it possible right now to preclude the delivery of Donetsk coal...well, let's say, to the Central Economic Region, to the Igumnovskaya GRES, while meeting a stream of Siberian coal going to the Donbass? Not in any case! The Kuznetsk coal is lumpy, and there is no crusher at the power plant. Back in 1965 there was a decision about converting the GRES to another fuel, but the power workers still are not prepared to carry it out. And all the deadlines for converting the Tyumenskaya TETs to gas have failed—coal has to be imported there from the Urals....

And it is like that in every case. No two coals are alike. In authorizing irrational haulage for a year, Gosplan anticipated that during this time the clients will be preparing to receive a closer fuel. The assumption was not vindicated, and next year again deviations from normal routings have to be authorized.

"We are the Section of Inventories, but in the inventories intake and outgo should not be reduced simply to tons—it should also be broken down by grades of coal," explained Gamlitskiy. "We are required to supply each enterprise with the coal that can be used most economically."

Well, the logic is ironclad. And up until recently the excesses in haulage costs were compensated for by fuel savings. However, in recent years the situation has changed. During January to July, customers suffered a deficit of more than 20 million tons of fuel. The country has coal. There is 1½ times as much coal at the underground and strip mines as the standard for reserves calls for, but transport is not coping. In order for power stations to prepare for winter, fuel is sent to them beyond every priority, even at the price of impeding other national economic freight. Yet, nevertheless, the arrears to the power workers reached 5.5 million tons and it is increasing daily.

And the cause is simple: transport, which is already overloaded, now drags 95 million tons of coal, that is, 1 ton out of 7, over forbidden routes, great or small, "by way of exception."

It would be good if the customer received the fuel he wanted, but indeed it does not turn out this way. I have before me a fresh study by Energoset'proyekt [All-Union State Design, Surveying and Scientific-Research Institute for Power Engineering Systems and Electric-Power Grids] specialists. It says: "Only an insignificant number of coal-fired electric-power stations regularly burn the designed fuel." And there are more facts: the Zaporozhskaya GRES requires coal of grade 17, the Partizanskaya—of grade 19, from 6 fields, and the Kurakhovskaya—of grade 26, from all coal basins, and so on. The operating regime must change but little daily. The whole matter again boils down to transport: when a power plant is on the verge of shutting down, the first train that turns up is sent. In the inventories, which consider the customers' needs, both as to quantity and quality of fuel, the transport link's potential is not considered, but it is that which has become decisive.

USSR Gosplan and Gossnab have given timely attention to the anomalies in haulage. Three years ago, by joint order, they required that a scheme for normal freight traffic for coal be made up, to replace the older one, which was weighted down with innumerable exceptions. The matter was entrusted to Soyuzglavugol' [Main Administration for the Supply and Marketing of Coal under USSR Gossnab] (this Gossnab element makes all shipments throughout the country). The Institute of Complicated Transport Problems, NIIMS [Scientific-Research Institute for the Economics and Organization of Supplying Materials and Equipment] and the Ministry of Railways made recommendations to the main administration. We say that under the scheme that NIIMS made up the average haulage distance could be cut by 108 km—one-seventh the current amount. However, main administration managers I. Ul'yanov and A. Soldatenkov did not accept a single idea. In the variants of the scheme that they presented, all the existing routes were described, including the prohibited ones. However, judge for yourself the quality of the plans. I asked Soyuzglavugol' Chief Engineer A. Soldatenkov what would the average haulage distances be under the new scheme:

"I don't know, we have not computed it," the answer followed.

It stands to reason that such a scheme could only perpetuate irrational routings: if they are still allowed in the form of exceptions, then henceforth they would become legal.

The Interagency Commission on Irrational Haulage rejected the Soyuzglavugol' plan. But simultaneously the other plans that were aimed at excluding superfluous operations also were declined. So everything remains as it was before.

Superfluous hauling and cross-hauling of freight have become the scourge of our economy. Our newspaper has written about them before. In particular, on 8 June excessive hauling of timber was mentioned—the situation that took shape there being clearly abnormal. As the facts indicate, the matter of hauling construction materials fares no better. Thus, prefabricated reinforced concrete is made by enterprises of 200 agencies, delivery being made under the principle: "From a certain supplier to a certain customer."

One can trace the consequences from this in the reports of the Sverdlovsk Railroad. Building materials (primarily prefabricated structure) occupy first place here among the freight shipped, 2,500 cars per month departing for all krais and oblasts. Can it be that the Middle Urals has an excess of capacity for this product? No, in turn more than 3,000 cars arrive with prefabricated reinforced concrete monthly on the Sverdlovsk Railroad. Again, from all parts of the country, from the Amur to the Kuban', and from Arkhangel'sk to Central Asia. In 1 year alone, the average distance for haulage rose from 720 to 906 km. And what else is this but every agency superposing its own haulage scheme on the country's map!

The interagency commission is now testing the regularization of routings, having prohibited the haulage of prefabricated structure over a distance of more than 800 km. The manufacturers have been required, when necessary, to exchange products with neighbors but not to transport them in cross-traffic. The solution was adamantly opposed by many agencies. Chief Specialist V. Kutyrev of the USSR Gosplan Transport Section showed me a whole file folder of protests—from Minvodkhoz [Ministry of Water Resources and Land Reclamation], Minenergo [Ministry of Power and Electrification], USSR Minpromstroy [Ministry of Industrial Construction],

Glavyumenneftegaz [Main Administration for the Oil and Gas Industry of Tyumenskaya Oblast], Udmurtneft' [Association for the Oil Industry of the Udmurt ASSR], and so on. And it was here that the Deputy Minister of Coal Industry, Ye. Krol', came in. He did not begin to argue--a rule is a rule. But he touched upon heavy structure, and specific products that have been authorized to be sent over any distance. The agencies should make up the list of exceptions. Thus he had sent such a list, including in it...all the products that are being hauled now. It proposed that ceiling-floor plates, bulkheads, road slabs and other loading types of prefabricated structure henceforth be pulled across the whole country--from Vorkuta, let's say, to Yakutia. In all, Minugleprom [Ministry of Coal Industry] would like to haul all but 100,000 cubic meters of prefabricated reinforced concrete by superlong-distance routes.

To the honor of the interagency commission's specialists, they declined this plan, and they did not pay any attention to any protest of the devotees of agency self-supply. But this is only the first step. You do not call the restriction that has been introduced severe--shipments over more than 800 km (which corresponds roughly to today's average distance for haulage) are considered permissible and not subject to control. As is also the case with coal, apparently, schemes for normal freight traffic for construction materials obviously are necessary. Work on them in the interagency commission drags on, but time does not wait.

The situation is such that branch-of-industry plans nowadays are realistic to the extent that they are provided with transport. Therefore, it is necessary, in approaching any task, to consider how the requirement itself for haulage can be reduced. Reductions in cross-hauling and excessive hauling means realistic help to transport, which has become a bottleneck of the whole economy.

11409

CSO: 1822

NEW RUBBER MIXTURE IMPROVES EFFICIENCY OF DRILLING EQUIPMENT

Baku AZERBAYDZHANSKOYE NEFTYANOYE KHOZYAYSTVO in Russian No 9, Sep 80 pp 63-65

[Article by S. A. Abasov, S. I. Mekhtiyeva, Institute of Physics of the Azerbaijan SSR Academy of Sciences, K. R. Akhmedov, Institute of Space Studies on Natural Resources of the Azerbaijan SSR Academy of Sciences, G. G. Akhmedov, Institute of Organochlorine Synthesis of the Azerbaijan SSR Academy of Sciences, and A. A. Makhmudov, Institute of Mathematics and Mechanics of the Azerbaijan SSR Academy of Sciences: "Experimental Use of New Rubber Mixture to Improve the Efficiency of Drilling Equipment"]

[Text] The plan for long-term development of the USSR oil and gas industry provides for a considerable increase in extraction of oil and gas in order to supply the country with fuel and energy raw materials. Drilling should play a decisive role in this matter. A further growth in the volume of drilling in the country will be primarily guaranteed by development of the West Siberian and extreme north regions. A simultaneous expansion has been planned in the volume of tunneling wells under complicated geological conditions at deep levels in already developed regions of the country.

For the successful fulfillment of the drilling plans it is primarily necessary to equip the drilling enterprises with a set of highly productive and reliable equipment. The most important link is drilling pumps, swivels, etc.

One of the main trends in improving the reliability and durability of the oil field rigs is an increase in the durability of the changeable parts of packing devices by perfecting their materials and designs.

In light of the increase in the maximum pressure of the drilling pumps in the near future, the problem of improving their reliability becomes more urgent, therefore, the development and application of new, highly efficient rubber items for drilling pumps is timely.

In order to improve the efficiency of drilling and extraction of oil and gas it is necessary to develop and master new formulas of rubber that would meet the strictest requirements made for modern oil equipment.

The efficient operation of rubber engineering items (REI) promotes the successful fulfillment of certain technological operations in the drilling process. The continuous operation of pumps, swivels, pipelines, etc. that determine the success of the tunneling, is practically impossible without rubber components that have a set of high physical and mechanical characteristics.

Table 1.

Indicator	Type of rubber	
	series-produced	experimental
Resistance to rupture in MPa:		
before thermal aging	23.2	25.7
after thermal aging at 100°C for 24 h	18.6	25.0
Relative elongation in %:		
before thermal aging	300	350
after thermal aging at 100°C for 24 h	150	250
Swelling in mixture of gasoline-benzene (95:5) in % for 24 h	2.4	2.0
Bonding strength of rubber with metal by method of separation, in MPA	0.0	8.2

Table 2.

Name of rubber engineering items	Experimental		Series-produced	
	Number of units	Average running time before break-down, in h	Number of units	Average running time before break-down, in h
Gasket of cylindrical cover	100	155	10	75
Packing glands of valve cover	10	277	10	87
Gaskets of cylindrical bushing	75	180	10	87
Packing rings of cylindrical bushing	10	362	10	185
Packing valves	64	284	10	93
F 150 pistons	56	168	10	96

One should also note that in the domestic oil drilling equipment, in order to make REI that operate under different conditions, from the viewpoint of the nature of deformation and the medium, one brand of rubber IRP-1293 that is not cold resistant is mainly used.

The time has evidently come for the development of a detailed classification of REI of oil drilling equipment not according to the generally accepted sign of applicability in the operating process, but according to the nature of the working deformations and the degree of influence of the environment. The consequence of these factors is a definite type of breakdown of the rubber items. Such an approach would meet most completely the operating requirements from the viewpoint of reliable equipment and improvement in its efficiency.

On this basis we developed a new formula for a rubber mixture based on SKN-40 m in which one-third of the sulfur in the IRP-1293 formula has been replaced by selenium [1,2].

This mixture was used to make pistons, gaskets, packing glands, etc. that are employed in drilling pumps U8-6 m and that meet specific operating requirements (oil-resistance, elasticity with fairly high strength, heat resistance, adhesion

strength to metals , etc.). The physical and mechanical indicators of the experimental and series-produced types of rubber based on SKN-40 m are given in table 1.

It is apparent from table 1 that the main physical and mechanical indicators for the new rubber mixture are significantly improved when one-third of the sulfur in the IRP-1293 formula is replaced with selenium.

Based on the suggested formula, the Baku REI plant produced experimental batches of rubber items (pistons, gaskets, packing glands, etc.) that are used to complete drilling pumps. They also conducted tests under field conditions. The results of these tests are given in table 2.

The experimental-industrial tests of the rubber items that were done in the Peschanka, Primorskiy, and Sangachaly offshore drilling administrations of the Kaspornetgazprom association demonstrated that the service life of the experimental items was improved on the average by 1.5-2-fold as compared to the series produced. This will increase the efficiency of drilling operations and extraction of oil and gas.

BIBLIOGRAPHY

1. Abdullayev, G. B.; Ismaylov, T.K.; Abasov, S. S.; et al. Certificate of Authorship No 529186, 1976, BYULLETEN' IZOBRETENIY, No 35, 1976.
2. Abdullayev, G. B.; Ismaylov, T. K.; Abasov, S. A.; et al. "Study of the Physical-Mechanical Properties of Selenium Rubber Based on Divinyl nitrile Rubber," DOKL. AN AZERB. SSR, Vol 34, No 4, Baku, Elm, 1978.

COPYRIGHT: Azerbaydzhanskoye Neftyanoye Khozyaystvo, 1980

9035

CSO: 1822

FUELS

WORLD'S FIRST SUPERDEEP WELL DRILLED ON KOLA PENINSULA

Moscow IZVESTIYA in Russian 9 Oct 80 p 3

[Article by Ye. Kozlovskiy, USSR minister of geology, doctor of technical sciences, chairman of the interdepartmental scientific council on the problem "Study of the Earth's Depths and Superdeep Drilling": "For the First Time in the World"]

[Excerpts] A depth of 10,500 meters was reached for the first time in the world at the Kola superdeep well. This is an outstanding success of Soviet science and technology. Some readers of IZVESTIYA ask: why are such wells needed, such, honestly, expensive records? We will try to discuss this.

Mankind has long been excited about the idea of superdeep drilling. But conditions for its practical realization were created only at the end of the 1950's. The USSR formed the interdepartmental scientific council on the problem "Study of the Earth's Depths and Superdeep Drilling." It included representatives of more than 20 ministries and departments and the USSR Academy of Sciences. The council organized work to create means of drilling and studying the near-shaft space of wells, and selected the sites for their laying. It guides the course of drilling. The Kola well is being drilled by a specialized expedition of the USSR Ministry of Geology. The machine construction ministries and departments developed and made the unique drilling equipment for it.

What is the importance of drilling the Kola well? First of all, something was successfully done that no one anywhere in the world has done: to observe, centimeter after centimeter, in natural occurrence a more than 10-kilometer section of the ancient continental earth's crust. Data were obtained on the properties of rocks at great depths, the extant ideas and geophysical models for the structure of the earth's crust were verified, and much more.

I will dwell on the most important aspects of the problems of the fundamental sciences about the earth that are solved by superdeep drilling. The model of the earth's crust of the continental type represents three layers. The upper is the sediment-volcanogenic mantle that is several kilometers thick. The middle is granite up to 35-40 km thick. The lower is basalt about 30 kilometers thick. In certain places the granite layer enters the ancient surface. The superdeep well is placed in precisely such a place. The ancient Baltic sheet has been exposed to destructive erosion for hundreds of millions of years. The scientists believe that the upper part of the granite layer, from 5 to 15 kilometers thick, has been

destroyed and carried away by water and glaciers. Therefore, by drilling a well 10 kilometers we are looking under the earth at all 25,000 meters.

It is interesting to compare the expected and the actually encountered geological section. Before the beginning of drilling the Pechenga region of the Kola peninsula had been studied by geological and geophysical methods, and by drilling to a depth up to 1,500 meters. It was expected that the Lower Proterozoic sediment-volcanogenic formations (they are about 2 billion years old) at a depth of 4,700 meters would be replaced by rocks of the granite layer, and at depth 7,000 meters the drill would encounter a basalt layer. The factual material destroyed these ideas. The base of the sediment-volcanogenic complex occurred at depth 6,800 meters. The well further entered and did not emerge from the granite layer that was represented by granite-gneiss formations. Their age was estimated at 2.5-2.7 billion years. It is remarkable that the sedimentation-volcanogenic thickness was close in geochemical characteristics to the formations of the groove zones in the central sections of the modern ocean beds.

The Kola well for the first time in the world intersected the horizontal boundary of sharp change in the rates of spread of the seismic waves. According to the model of deep structure of the earth's crust, this boundary (so-called Konrad's surface) was identified for the entire globe with the interface of the granite and basalt layer of the lithosphere.

The deeper into the well no suggested increase was observed in the density of rock, rate of spread of the elastic oscillations, and other changes in the physical parameters of the rock mass. The findings are the basis for new refined models for the structure of the earth's crust and the earth's mantle. They will formulate a more complete theory to interpret the geophysical data and will permit development of equipment to study substances at great depths.

It seemed to certain researchers that the ancient crystalline foundations of continents were passive in relation to ore formation. The well showed that this is not so.

Gases and influxes of water were found the entire length of the Kola superdeep section. They circulate over thick zones of tectonic disturbances. The interstitial water is distinguished by high mineralization and contains bromine, iodine and heavy metals. The gases are represented by helium, hydrogen, nitrogen, methane and other hydrocarbons.

In the interval of 1,600-1,800 meters the well revealed previously unknown sulfide cupronickel ores. The new discovery raises the question of deep exploratory work not only here, but in many other ore regions of the country. Large zones of shattered rock with low-temperature hydrothermal mineralization were found at great depths. Pieces of rock are cemented by quartz, calcite, sulfides of copper, iron, lead, zinc, nickel, cobalt and other minerals. And finally, at depths over 7,000 meters there were signs of magnetite, phlogopite, muscovite and sulfide mineralization. These data that indicate active gas-water processes under enormous pressures and high temperatures significantly broaden the outlook for detecting new ore levels. Thus, thanks to the superdeep drilling our ideas about the formation and laws governing the arrangement of the hydrothermal ore fields have been significantly expanded.

The facts of finding organisms and the unexpected behavior of the earth's temperature gradient are important. The well encountered 17 types of fossilized microorganisms. This indicates the biogenic processes that apparently occurred on the planet about 2 million years ago. An increase in the rock temperature with depth to 3,000 meters corresponded to the forecasts. It was 1 °C per 100 meters. Below the indicated depth the temperature gradient increased to 2.5° per 100 meters. As a result, at depth 10 kilometers the temperature reached 180° instead of the expected 100. This is associated with the powerful thermal stream that travels from the depths of the earth. The cold drilling solutions that are injected into the well return to the surface heated to 45°.

This is only part of a far from complete list of the geological and geophysical results from drilling the Kola well. They have basic value for solving fundamental problems of earth science and the future economic development of deep sections of the earth's crust.

Drilling of superdeep wells, like the study of space, is an indicator for the level of scientific and technical potentialities of a state. Soviet drilling science and technology that is based on the achievements of domestic heavy machine construction, metallurgy, chemistry, automatics and other branches of industry, created unique equipment for tunneling wells 12-15 km deep. This includes the drilling unit "Uralmash-15,000." The results are on hand, for a unique well has been drilled and a mass of valuable information has been obtained about the secrets of the earth's depths. This is a significant step in understanding the history of our planet, understanding its structure, and using the natural resources of the earth for the good of man.

What are the further stages in implementing the superdeep drilling program in the USSR? Where and for what purpose will new wells be made?

The Kola well studies an ancient platform. Now it remains to define the structure of the so-called young platforms (West Siberia, Ciscaucasia) and complexly built folded regions. These are, for example, the relatively recently formed (500-800 million years ago) mountain systems. The plans include a study of the deep structure of young volcanic regions and seismically active regions. In the folded systems (Urals, Tyan'-Shan' and others) superdeep drilling will permit a study of "mountain roots," their "foundation" as well as the depth of spread of different mineral fields. In the regions of modern volcanism, in addition to solving geological-geographical tasks, the evaluation of the possible use of deep heat has enormous practical importance. Tunneling of Ural and Tyumen' superdeep wells will begin in the near future. One of the goals of the Tyumen' well is to search for and study new deep oil and gas bearing levels.

The experience of drilling the Kola superdeep well and the nature of the tasks that still remain to be solved in the regions of new wells show that the Soviet scientists and specialists need to intensify scientific research and experimental design work to perfect the equipment and technology for superdeep drilling, and special control and measuring apparatus. This refers first of all to the perfection of high-strength drilling pipes and locks, rock-breaking tools that guarantee efficient drilling while taking core samples in high temperatures, thermally stable reducer turbodrills, geophysical equipment for working deeper than 10 kilometers, stoping apparatus for recording the drilling patterns, chemical reagents and lubricating

additives for thermally stable drilling solutions, and special thermally stable materials for fabricating the drilling tools and stoping motors. Work has begun to make a test stand that can simulate the conditions for tunneling wells 15-20 km deep with temperatures on the face of 300-400°C.

The scientific and practical importance of tunneling the Kola well, like super-deep drilling in general, is enormous. The basis for the success and the basis of the discoveries of new fields of minerals is the powerful scientific and technical potential of the Soviet Union.

9035

CSO: 1822

VOLZHSKIY PLANT MAKES THIN-WALL SPIRAL-WOUND TUBE FOR PIPELINES

Moscow PRAVDA in Russian 20 Oct 80 p 3

[Article by V. Goncharov (Volzhskiy, Volgogradskaya Oblast): "For the Underground Arterials"]

[Excerpts] There are larger pipe plants in the country than the Volzhskiy plant. But in efficiency factor, activeness of engineering thought, and the results of creative studies, it is among those to which other enterprises in the industry are compared, or, in any case, to which they should be compared. Volzhskiy plant workers enjoyed an especially great success during the current five-year plan. They achieved remarkable results in raising output quality and production effectiveness.

Every time you come here you expect something new. Why this sensation? Perhaps because the collective here is young, as is the city itself in which the plant has grown up. And daring and inquisitiveness are inherent, as is known, in youth. I was sharing these thoughts with Igor Pichurin, chief engineer of the plant. Neither is he from the older generation. "We give the green light to every reasonable idea. And this stimulates a new reaction of creative inquiries. So the palm for originality really goes to the young," he noted. That is how it is. Several years ago Viktor Ustinov's brigade came forward with a valuable initiative. It called upon all to promote competition under the slogan, "For high quality, from brigades to sections and departments." The majority of the collectives responded. Everyone's target was the same—yield output of better quality. Naturally, the workers' initiative required engineering support. And it was provided.

But first a few figures. During the five-year plan the collective produced 20,000 tons of pipe for various purposes above the plan. About 2 million tons of some large-diameter gas pipeline—this is 5,000 km of pipeline—were shipped off to various ends of the country from Volzhskiy. And the State Emblem of Quality was on almost every piece of pipe. The production of goods with the honorary pentagon has trebled during 4½ years, reaching almost 50 percent.

There is still another of the collective's achievements that I would like especially to talk about. The production of heat-resistant thin-walled tube was mastered here, for the first time in the country. As a result, the national economy has saved 366,000 tons of metal. This is almost enough for the annual program for the output of gas pipeline for this enterprise. The credit here goes not only to Volzhskiy plant workers themselves but also to workers of the Novolipetsk

Metallurgical Plant. A number of scientific-research collectives, along with the pipemakers and metallurgists, solved this problem, which was far from simple.

...We are walking past the mills. Large coils are being unwound. The steel ribbon is fed into a unit and there it is unwound spirally into a pipe. All operations are automated and monitored from a single panel of the mill.

"Back 10 years ago the spiral-weld method was considered unsuitable for making gas pipeline," says I. Pichurin. "Many were of the opinion that these tubes would be second-grade. Thus the straight-welded ones were just right for gas. But flat-rolled product was needed for them. And the wide-plate mills already had conceded primacy for productivity to continuous-rolling mills. Yes, our spiral-weld units are also much more flexible than their brethren. They can be changed over from one size to another. And neither is rolled product of a strictly prescribed width required. Thermal hardening provides for high reliability of the product."

The new technology opened up the possibility of making gas pipeline with walls 12-15 percent thinner. Nowadays, half of all the plant's product is lightweight. At first glance, it was all very simple. The pipemakers, by improving the technology, automation of production and technical monitoring, raised the quality and reliability of their product, and they ordered metal with negative allowances from the Lipetsk rolling-mill operators. The latter fulfilled the request. But there was so much work and worry about one thing or another behind these events!

All this work was performed with the metallurgists under a collaboration agreement. In Lipetsk, for example, much was done to improve the quality of the stock. And this is a 35-ton coil. You do not unwind it, you do not inspect its surface, you do not trim the edges. Then all the flaws emerge during welding of the tube, during a check of its strength. The converter operators introduced synthetic-slag treatment of the steel and took other measures to improve its quality. Simultaneously, control over pouring of the metal, purity of the crystallizing agents, and the water-cooling regime were improved. The purpose was the same--to obtain pure metal at Lipetsk, to roll from it stock without surface defects, and then to weld from it, at Volzhskiy, large-diameter gas pipeline of increased impact strength. An improved system for quality control in the manufacture of products throughout the whole industrial chain was required. Leningrad scientists of the All-Union Scientific-Research Institute for High-Frequency Currents came to the rescue. Joint efforts created means for automatic control.

And then Surguttruboprovodstroy [Surgut Trust for Pipeline Construction] construction workers also were included in the collaboration. The creative search for more effective production solutions and competition for quality traveled along the whole chain: metal-tube-gas pipeline. I will say, getting ahead of my story, that the competition is not waning, even today. This year, Novolipetsk's metallurgists, under a start-to-finish agreement, for example, have committed themselves, through a further improvement of the coiled steel, to reduce a shifting of the pipe to reduced quality. Here there is direct concern about the final product that is produced on the Volga's shores. Volzhskiy plant personnel in their turn resolved to reduce the amount of pipe returned to the department for repair because of welding defects by 10 percent. The pipeline builders gave their word to connect the pipe into gas pipeline without loss. All of them together are conducting narrowly directed research, all for the same purpose: to raise final product quality, that

is, the gas pipeline, and the effectiveness of the work of each of the interdependent entities.

The thin-walled tube was created as a result of the collaboration of the interdependent organizations. In the final analysis, this has led to great economic benefit. Volzhskiy's plant personnel deserve special credit here. Not only because it was they who, in essence, were the originators of the idea, but still more because they firmly held out in the struggle with the notorious "gross" and convinced the gas pipeline builders of the suitability of the thin-walled pipe for the national economy.

The fact is that the builders had a direct reason to bury heavier pipe, which also means more expensive pipe. And here the innovation hit the pipemakers painfully in the pocket. The gross in tonnage decreased, and the percent of plan fulfillment fell. As a result, deductions into the economic incentive fund were reduced. So much paper has been covered with writing, so many copies have been collated, to provide a simple truth: that what is advantageous for the state should be advantageous for the collective.

The Volzhskiy pipemakers proved to be pioneers also in solving another problem of no less importance--the output of pipe with an anticorrosion coating. They participated in creating new equipment, and they fine-tuned the technology. Their specialists also matured. In brief, pipe with factory-applied insulation coating had now been created. These also were the first sections of gas pipeline to be laid without additional insulation being applied under field conditions. This brought no small saving. But the main economic benefit is seen in an extension of the service life of the gas pipelines.

"Based on the technology already developed, the ministry is creating a new highly productive installation for applying the anticorrosion coating," they told me with satisfaction at the plant. "The chemists promise to produce high-quality epoxide powders that will insure increased impact strength for the coating. By the end of the next five-year plan about 300,000 tons of gas pipeline should be sent to customers in a factory-applied insulation jacket."

All these successes are the result of the initiative and creativeness of the plant's whole collective and the competition for proper fulfillment of 25th CPSU Congress decisions. From year to year, Volzhskiy pipemakers have carried out the plans set for them and have been engaged in the construction of what is now the new pipe-rolling department and in the training of personnel to work on the hot-rolling mills. And in so doing they dared, created and tested. And they had no few difficulties.

It was noted above that, along with Leningrad scientists, factory engineers created, for example, various sensors and entire installations for quality control. This is complicated equipment, whose output is the job only of instrumentmaking enterprises. In Volzhskiy they are making them today. Under semicottage-industry conditions, of course. But the problem was solved.

At the same time, one cannot refrain from mentioning those organizational squabbles that slow the plant's work. Primarily, the claims on the Volgograd Division of the Volgograd Railroad. Now and then it fails to deliver gondolas, because of which shipping the finished product is hindered. The Ministry of Railways was even

compelled to publish an order that at least 160 gondolas be furnished this enterprise per day. But alas, the order has miscarried.

"In September the deficit in deliveries to us was more than 1,000 gondolas," complained plant director V. Kas'yan. "As a result, thousands of tons of pipe remained unsold. Because of this, you can't, as they say, get through the place. But most of all, this has been telling on the plant's economics. And one cannot shrug off the moral factor with statements. At each section, competition for plan overfulfillment is going on. Incidentally, the railroaders let us down very often."

There is a new event at the plant these days. In the pipe-rolling department that is under construction, the first line, with a capacity of 90,000 tons, has been turned over for operation. Before the end of the year still another one will begin to operate. Next year the plant will go into operation completely. It will produce hundreds of thousands of tons of output for bearing plants and machine-building enterprises. Coming up is the construction of a pressworking department.

Construction workers are still laboring in the pipe-rolling building, along with the plant's operators. There are more of them than of pipemakers. But already the first rotary-ring furnace is breathing at a high temperature, and the first mills are operating. There is also the first output. This new specialty of the plant is one that is to be assimilated to perfection during the Eleventh Five-Year Plan. And there will again be creative inquiries and daring.

11409

CSO: 1822

END

END OF

FICHE

DATE FILMED

~~3~~ 7 Jan 1981

DD